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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,219	09/17/2003	Whonchee Lee	108298705US	6284

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EXAMINER

NGUYEN, DUNG V

ART UNIT

PAPER NUMBER

3723

DATE MAILED: 08/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,219

Applicant(s)

LEE ET AL.

Examiner

Dung V Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 39-57 is/are allowed.
- 6) ☒ Claim(s) 1, 3-10, 13-15, 19, 24-32, 37 and 38 is/are rejected.
- 7) ☒ Claim(s) 2, 11, 12, 16-18, 20-23 and 33-36 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/22/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 5-9, 15, 19 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chadda et al (USPN 6,464,855). Chadda et al discloses a method for removing material from a microelectronic substrate 120 comprising disposing an electrolytic liquid between an electrically conductive material of a microelectronic substrate 120 and at least one electrode 160, contacting the microelectronic substrate 120 with a polishing pad material 140, electrically coupling the conductive material of the microelectronic substrate 120 to a source of varying electrical signals 80 via the electrolytic liquid and the at least one electrode 160, applying a varying electrical signal to the conductive material, moving at least one of the polishing pad material 140 and the microelectronic substrate 120 relative to the other, removing at least a portion of the conductive material from the microelectronic substrate 120 while the electronic liquid is adjacent to the electronically conductive material, controlling a normal force between the microelectronic substrate 120 and the polishing pad material 140 to be about 0.5 psi or less, oxidizing at least a portion of the conductive material by applying the varying electrical signal to the conductive material, wherein the conductive material includes tantalum, wherein the electrolytic liquid had an organic acid or organic phosphate as a

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constituent (note Fig. 4, col. 1, lines 26-35, col. 4, line 8 to col. 5, line 19). However, Chadda et al does not disclose that the electrolytic liquid having about 80%, 50%, 10% or 1% of water. It would have been obvious to one having ordinary skill in the art at the time the invention was made to select an electrolytic liquid having about 80%, 50%, 10% or 1% of water, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

3. Claims 1, 3, 5-7 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishii et al (USPN 5,562,529). Kishii et al discloses a method for removing material from a microelectronic substrate 53 comprising disposing an electrolytic liquid between an electrically conductive material of a microelectronic substrate 53 and at least one electrode 45a, contacting the microelectronic substrate 53 with a polishing pad material 43, electrically coupling the conductive material of the microelectronic substrate 53 to a source of varying electrical signals 31 via the electrolytic liquid and the at least one electrode 45a, applying a varying electrical signal to the conductive material, moving at least one of the polishing pad material 43 and the microelectronic substrate 53 relative to the other, removing at least a portion of the conductive material from the microelectronic substrate 53 while the electronic liquid is adjacent to the electronically conductive material, positioning the first electrode 45a and a second electrode 45b proximate to and spaced apart from the microelectronic substrate 53, disposing the electrolytic liquid in fluid communication with the microelectronic substrate 53, the first electrode 45a and the second electrode 45b,

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passing the electrical signal from the first electrode 45a through the electrolytic liquid to the microelectronic substrate 53 and from the microelectronic substrate 53 through the electrolytic liquid to the second electrode 45b (note Fig. 10 and 11, col. 8, line 20 to col. 10, line 9). However, Kishii et al does not disclose that the electrolytic liquid having about 80%, 50%, 10% or 1% of water. It would have been obvious to one having ordinary skill in the art at the time the invention was made to select an electrolytic liquid having about 80%, 50%, 10% or 1% of water, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

4. Claims 1, 3-10, 13-15, 19, 25-32 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al (US 2003/0178320). Liu et al discloses a method for removing material from a microelectronic substrate 208 comprising disposing an electrolytic liquid between an electrically conductive material of a microelectronic substrate 208 and at least one electrode 209, the electrically conductive material including at least one of tantalum and a tantalum compound, the electrolytic liquid including a non-aqueous polar solvent, contacting the microelectronic substrate 208 with a polishing pad material 203, electrically coupling the conductive material of the microelectronic substrate 208 to a source of varying electrical signals 224 via the electrolytic liquid and the at least one electrode 209, applying a varying electrical signal to the conductive material, moving at least one of the polishing pad material 203 and the microelectronic substrate 208 relative to the other, removing at least a portion of the conductive material from the microelectronic substrate 208 while the electrolytic liquid is

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adjacent to the electronically conductive material, complexing the tantalum as a metal-organic species in solution, controlling a normal force between the microelectronic substrate 120 and the polishing pad material 140 to be about 1 psi or less wherein the electrolytic liquid includes an organic solvent and a salt as constituent (note Fig. 1, paragraph [0019] to [0087]). However, Liu et al does not disclose that the electrolytic liquid having about 80%, 50%, 10% or 1% of water. It would have been obvious to one having ordinary skill in the art at the time the invention was made to select an electrolytic liquid having about 80%, 50%, 10% or 1% of water, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

5. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al (US 2003/0178320) as applied to claim 26 above, and further in view of Kishii et al (USPN 5,562,529). Liu et al discloses the claimed invention as described above, however, Liu et al does not disclose positioning the first electrode and a second electrode proximate to and spaced apart from the microelectronic substrate, disposing the electrolytic liquid in fluid communication with the microelectronic substrate, the first electrode and the second electrode, passing the electrical signal from the first electrode through the electrolytic liquid to the microelectronic substrate and from the microelectronic substrate through the electrolytic liquid to the second electrode. Kishii et al discloses positioning the first electrode 45a and a second electrode 45b proximate to and spaced apart from the microelectronic substrate 53, disposing the electrolytic

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liquid in fluid communication with the microelectronic substrate 53, the first electrode 45a and the second electrode 45b, passing the electrical signal from the first electrode 45a through the electrolytic liquid to the microelectronic substrate 53 and from the microelectronic substrate 53 through the electrolytic liquid to the second electrode 45b (note Fig. 10 and 11, col. 8, line 20 to col. 10, line 9).. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method for removing material of Liu et al with the steps disclosed by Kishii et al in order to uniformly polish a whole surface of a substrate.

Allowable Subject Matter

6. Claims 39-57 are allowed.
7. Claims 2, 11, 12, 16-18 and 20-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hisamatsu et al and Easter et al are cited to show electrochemical mechanical planarization apparatus and method.
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung V Nguyen whose telephone number is 703-305-0036. The examiner can normally be reached on M-F, 6:30-3:00.

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10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph J Hail can be reached on 703-308-2687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DVN
August 2, 2004



DUNG VAN NGUYEN
PRIMARY EXAMINER